Abstracts

A Linear Statistical FET Model Using Principal Component Analysis

J.E. Purviance, M.C. Petzold and C. Potratz. "A Linear Statistical FET Model Using Principal Component Analysis." 1989 Transactions on Microwave Theory and Techniques 37.9 (Sep. 1989 [T-MTT] (Special Issue on FET Structures Modeling and Circuit Applications)): 1389-1394.

An important issue in statistical circuit design, other than the algorithms themselves, is the development of efficient, statistically valid element models. This paper first presents what is needed for a good statistical model. The standard FET model is shown to be difficult to use in a statistical simulation, due to the nonlinear relation between FET S parameters and model parameters. A linear statistical FET model is then proposed based upon principal component analysis. This linear model gives uncorrelated model parameters. In an example using measured S-parameter data from 90 0.5 µm GaAs FET's, 13 uncorrelated model parameters were needed to model the data from 1 to 11 GHz and at one bias. Simulation using this linear model and issues relating to bias are discussed.

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